HOW-TO: THERMITE HARD DRIVE DESTRUCTION

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After the overwhelming response to the Hackit we posted about automated hard drive destruction last fall, we finally decided to test out some thermite hard drive destruction ourselves. This has been done on The Screen Savers but they did not show up close results of the platters. So, aluminum and black iron oxide were procured through eBay, and until it arrived we watched some YouTube videos that showed a lot of fire and no real results. We decided to see what it would take to completely obliterate a drive.

With the amount of personal data stored on your computer, we all understand the importance of destroying the data that is stored on the platters of a hard drive before disposing of it. There are many ways to destroy a hard drive; software, physical disassembly, drills, hammers, magnets/electromagnets, and acid, but none are quite as outrageous and dangerous as thermite. That's what we're going to do here today. Follow along for pictures and videos of the results.

A couple different methods of containing the thermite above the hard drive were tried and we quickly found the best way is a clay flower pot with the drip tray for a lid. An Altoids tin was also tried, but it burned up to quickly. Molding a cement container was also attempted. Since

thermite is extremely hard to ignite, sparklers that were left over from the 4th of July were used, and offered a very reliable method of ignition.

Our goal was to completely destroy the drive while it was still in the computer case. The theoretical application is to destroy the disk at a moments notice so it won't fall into the wrong hands. After testing multiple methods, placing about 1 pound of thermite in a clay flower pot and lighting from the drain hole in the bottom yielded the best results. This could easily be placed in the 5.25″ bays above the drive.

A thermite reaction is a process in which the correct mixture of metallic fuels are combined with a metal oxidizer and ignited. Ignition itself requires extremely high temperatures, but once ignited, thermite supplies its own source of oxygen. It can potentially burn underwater when mixed properly. Thermite is usually used to weld railroad ties together.

The most common thermite is "black or blue iron oxide (Fe_3O_4), produced by oxidizing iron in an oxygen-rich environment under high heat" and Aluminum(Al). Red iron(III) oxide (Fe_2O_3), commonly known as rust, can also be used. There are many chemicals that can make thermite; the mixtures used to make thermite therefore vary, causing confusing and changing mixture ratios.

Since the oxidation of one substance involves the reduction of another, this type of reaction is often called redox reaction. In the following balanced reaction, 8Al + 3fe3O4 = 4Al2O3 + 9Fe + Heat. The element Al is oxidized, but Fe is reduced. This reaction is also called a displacement reaction because Al displaces Fe in the oxide. Because of the nature of this reaction, the correct ratio of substances is important to ensure the optimum amounts of fuel (aluminum) and oxygen (iron oxide) within the mixture. Thermite is very safe to handle because of the high ignition temperatures required, sparklers were used in this instance, however magnesium ribbon can also be used. We think an electric pyrogen igniter would be a far better choice for ignition, instead of unreliable methods.

There are two important aspects to ensure a successful reaction. Thorough/even mixing and smallest possible powder particle size. If thermite is not adequately mixed, it may be difficult to ignite or maintain the reaction. One problem when mixing thermite is the difference in weight between the aluminum and the iron oxide. This causes them to separate out rendering the thermite useless. The process used here with great success was five minutes in a rock tumbler. Powder particle size is measured with a measurement called mesh. Passing the powder through a mesh will determine the largest particle size, this reaction performs best with the smallest obtainable mesh size. The mesh size for aluminum was 1200 mesh and black iron oxide was 300 mesh.

The total enthalpy or heat content released is -3.677 kJoule per gram of Fe3O4/AL thermite. The ratio of Fe3O4 to aluminum powder by weight is about 3.22 to 1, according to the reaction's stoichiometry. The reaction photographed was 200 grams of Aluminum and 644 grams of black iron oxide yielding 2368 kJoules of heat. This was more than was required to adequately destroy the hard drive, a smaller amount could have been used, and still destroyed the platters. It would have even been better controlled, or better yet contained within the computer case. What fun is that?

Using thermite to destroy a hard drive is a very violent and destructive process. Great care should be taken as the molten metal can splash and sputter for a long distance.

The reaction begins to sputter.

The thermite has just contacted the hard drive.

Things are really hot now!

Most of the reaction is completed.

The molten thermite, platters and most of the aluminum frame from the hard drive in the bottom of the case.

Above are the molten hard drive platters destroyed with 844 grams of thermite. It takes about this much thermite contained directly above the drive to get the job done, if it is not you will just get a superficial fire.

Over all the destruction of the drive and platters was accomplished in all cases in a matter of seconds. This is by far a guaranteed method of destroying data in a time of need. We're pretty sure this will prevent most forensic data recovery methods.

Below is a video of Brainiac using thermite to burn cars and trying to stop the reaction with liquid nitrogen.

Here’s the directors cut of the thermite video which contains 4 extra minutes:

Finally, please do not try this.